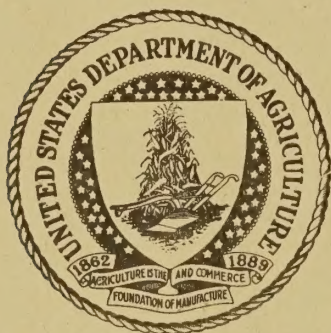


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OUTLINE OF ELECTRIC APPLICATIONS
FOR
POULTRY PRODUCTION

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INTRODUCTION

Data should be secured on the importance of poultry production in the region or state where these applications are recommended. An explanation should be given that five requirements must be fulfilled by the poultryman before satisfactory results can be obtained with electricity. These requirements are:

1. Purchasing blood-tested, pullorum-free chicks, from a hatchery supplying guaranteed chicks of high egg producing bloodlines.
2. Feeding balanced rations of properly prepared, high quality feed, and sufficient water continuously supplied.
3. Proper sanitation of buildings and control of range areas by approved methods.
4. Adequate, draft-free, weatherproof housing.
5. Rigid culling of defective and nonproductive birds.

With the above requirements satisfied, it will be of economic advantage to apply electricity to poultry production. Electric power may be profitably adapted in the following ways.

I. Brooding

A. Advantages of using Electric Brooders:

1. Cheaper, usually costs less than other ways of brooding, generally less space to heat.
2. Safer; little if any fire hazard.
3. Easier to operate, less watching, no fuel or ashes to handle, less labor required.
4. Better - cleaner, more uniform heat, causing chicks to be sturdier, mature and feather quicker with lower mortality.

B. Kinds of Brooders:

1. Commercially manufactured
 - (a) Hover type
 - (1) Sizes - 50 to 500 chick capacity.
 - (2) Design - Insulation
 - (3) Heating elements
 - (4) Ventilation

(b) Battery type brooders

2. Homemade- hover type most common.
 - (a) Sizes - 50 to 500 chick capacities
 - (b) Design - Insulation important

C. Heating Elements

1. Coil wire - must have thermostat and screen guard to prevent burning chicks, or igniting litter.
2. Black heat type - metal ring that never gets hot enough to glow. (Many better type commercial built brooders use this type)
3. Incandescent or heat type lamps - Wafer type thermostat should not be used because points may stick in the "on" or "off" position. Heat is controlled by using smaller size bulbs as the chicks get older or less heat is needed.
4. Fans or adjustable parts should be provided for ventilation to prevent dampness.

II. Poultry Water Warmer.

Large amounts of water are essential when hens are in production. Eggs are 65 percent water and highest prices are paid for eggs when the weather is coldest. Water must not freeze if production is to be maintained.

A. Kinds

1. Commercially manufactured.
 - (a) Immersion type with built-in thermostat.
 - (b) Coil wire heating element with thermostat.
 - (c) Lead or rubber covered soil heating cable for running water installations.
2. Home made - use a 50 or 100 watt light bulb. Put a tube three inches in diameter and two feet long into a bucket. Place about an inch of sand in the tube and then place the light bulb in the tube and cover the bulb with sand. The height of the sand should not be higher than the water in the bucket. The tube must be water-tight.

B. Results

1. A 20 percent increase of egg production by adequate, unfrozen water supply has been obtained in Illinois. Drastic reduction in egg production has been noted on the day following failure of the water supply.
2. The cheap initial cost over increased egg production when eggs are selling at high prices will repay the cost of a water warmer many times in one season.

III. Night Lighting

Higher prices for eggs in the late fall and winter months offers increased income with a higher egg production during this time. Short daylight hours prevent the hens from getting enough feed for high production. It should be noted that night lighting does not increase yearly production of eggs per hen, but it does induce the hen to lay the eggs at a time when the prices are highest.

A. Requirements of Lighting

1. Hens require a minimum of 14 hours of light daily for satisfactory production. In winter, with eight hours of daylight, an additional six hours or more of artificial light is needed. This light may be supplied either in the evening or in the morning. Lights may be on all night if desired.
2. Lights may be operated manually, or by an automatic switch.
3. In using either morning or evening lighting, approximately one watt per 5 sq. feet of floor space is needed. A 20 x 20 house needs 80 watts of light. The entire floor space and roosts should be lighted.
4. All night lighting needs less light as only the area around the feed and water containers is lighted. A 20 x 20 house lighted all night needs 15 watts of light placed over the feed and water containers. In larger houses use 15 watts for each 100 birds. Be sure to use enough light to be able to attract the birds from the roost, but not enough to prevent them from resting if they wish to.
5. Homemade or purchased reflectors should be used to direct light upon the feeding and watering area.
6. When lighting is started it should be increased slowly or the birds may be thrown out of production and into a molt. When the use of lighting is decreased it should also be done very slowly. Sudden changes in feed mixtures, house temperatures, water supplies, and the amount of additional lighting can be expected to seriously reduce egg production. Re-establishing high production is slow and expensive.
7. All night lighting for turkeys will induce them to eat more feed and also prevent panic, crowding and smothering which frequently causes losses.

B. Control - manually operated or automatic switches.

IV. Poultry House Ventilation

In cold climates the temperature difference inside and outside the poultry house will cause moisture condensation on the floor, walls and ceiling. Controlled movement of air or ventilation will remove this moisture without drastic changes of inside temperature. This can be accomplished by the use of an electric driven fan to exhaust the air. The ventilation fan should be small in size requiring long

time operation. This will maintain nearly constant temperature and insure constant moisture removal. Elaborate installations may use a humidistat to control fan operation, but manual control should be satisfactory for the average farm.

V. Poultry Picker

The poultry picker may be used economically where a large quantity of poultry is dressed for market.

- A. Most pickers are manufactured commercially and are of the cylinder type. The cylinder has rubber fingers and the bird is held by its neck and feet against the fingers as the cylinder rotates. The feathers are rubbed off in a manner similar to the action of a fast, skilled poultry picker. A skilled operator can pick a chicken in approximately 10 seconds.
- B. Another type is the revolving disc picker. The feathers are caught and pulled out by the camming action of the revolving discs.
- C. Mechanical pickers range in size from a single operator machine driven by a 1/4 h.p. motor to multiple operator machines driven by a 10 h.p. motor. The smaller machines cost approximately \$100 and can handle 400 birds per hour when used by a skilled operator.

VI. Electric Feed Grinders

Commercially ground poultry feeds cost about \$5 per hundred pounds, while home grown and ground feed, together with certain added protein supplements, will cost only \$3.00 or \$3.50, depending upon the location and the mixture used. Home grown and ground feed can be mixed to form a well balanced ration. The cost for grinding shelled corn varies from 1/2 to 1 kwh per 100 pounds of feed. Thus, the cost of home mixed feed is much cheaper than commercially mixed feed.

A. Types of Grinders

1. Buhr or Plate Mill. The grain is broken and ground between cast steel plates or buhrs held to the proper tension by a heavy adjustable spring. This type of mill is particularly adapted to electric power. It is a comparatively slow speed machine requiring little power to maintain that speed. Therefore most of the power is used in the grinding operation. Mills of this type designed for tractor operation and having 6 inch and 8 inch diameter plates can be driven satisfactorily by 5 horse power and 7 1/2 horse power electric motors respectively. These mills can be fitted with different size plates to fit the power of the motor available. When grinding ear corn for cattle a slow speed cob crusher should be installed in the hopper of the mill.

2. Hammer Mill. Hammers fastened on a shaft swing when the shaft is rotated at a high speed breaking and knocking the grain through a screen. The fineness of the feed depends upon the size of the screen openings. Capacities of hammer mills vary with the fineness of the screen through which the grain is forced and the condition of the grain. Dry, hard grain grinds easier than soft or damp grain. Capacity for corn is much greater than for oats when the same size screen is used. In extremely fine grinding only 150 to 200 pounds of oats per hour may be ground while 500 pounds per hour of corn might pass through the same screen. Hammer mills designed for tractor operation require more power than is economically available when using electricity. Such mills are not generally convertible to electric motor drive, due to the size of motor required. Electric motor driven hammer mills should be especially designed for motors 10 horse power or less in size. Hammer mills are high speed machines and require a large portion of the motor power to drive them. Consequently, less motor power is available for grinding the grain. This is especially noticeable when grinding ear corn.

B. Overhead grain and feed bins. These bins can be constructed so as to enable automatic feeding of grain to these mills. More than one kind of grain can be ground at one time and by putting the proper ratio of grains into the grinder, the feed will mix while being ground. The feed can be ground, mixed, and returned to an overhead feed bin without personal attention if the overhead gravity type supply is used. The grinder may be started, the amounts of grain to be ground set and the mill will require no watching, enabling the operator to go about doing other work.

C. Advantages of Home Grinding with Electricity.

- 1 - Cheaper grinding costs.
- 2 - Semi-automatic, using less labor.
- 3 - May grind home grown feed, reducing feed costs.

VII The Electric Debeaker

Cannibalism in chickens may develop from overcrowding, feed deficiencies, or from accidental injury which gives the chickens a taste of blood. The pain of being pecked may cause the chicken to run and it will run itself to death. A chicken's upper mandible is curved and very sharp. As the chicken eats mash out of the hopper, it tends to throw or hook the mash out and what is thrown out is usually lost in straw or litter on the floor. A bird that has been debeaked will bite down in the mash and will not hook the mash out.

A. How to Debeak.

- 1 - The beaks may be cut off with a knife or other instrument but this may result in the bird's bleeding or not being able to eat because of soreness. In most cases the beak will grow back and the job will have to be done over.

2. The electric debeaker has been developed and used very satisfactorily. This device consists of an electrical heating coil that raises the temperature of a metal bar to red heat. This bar may be raised and lowered by a combination foot and hand lever. When down it makes solid contact with an iron crossbar. This crossbar is hollow and water runs through it, keeping it cool. The bird's bill is opened and the upper half is placed on the crossbar, the lower half underneath. This water cooled bar is not hot enough to burn the bird's tongue. When the beak is in position, the operator steps on the foot lever forcing the hot bar down on the upper half of the beak. When the job is properly done $1/4$ -inch to $3/8$ inch of the beak is taken off. The heat is sufficient to burn the beak, cauterizing the live tissues so that there will be no bleeding or additional growth. Birds so treated show no unfavorable reactions as they eat and lay normally after debeaking. In many cases they have been noted to be contentedly "singing" or eating a minute or so after the operation.

- B. Cost of the debeaker is approximately \$15 and consumes 220 watts of current to operate. On REA lines this is less than 2¢ per hour. Two men can debeak 100 birds per hour if they are penned beforehand. A very good time to debeak is at the time of culling.

VIII. Cooling, Cleaning, Candling and Grading

Eggs that have been carefully cleaned, candled and graded command higher prices. This increase in prices more than pays for the labor, current consumed, and the cost of the equipment.

- A. Cleaning. While hand buffing is a common practice for cleaning eggs, some producers use homemade emery cloth buffers driven by a small fractional horsepower motor. These are easily made and cost very little to construct and operate.
- B. Candling. With an electric candler it is possible for the poultryman to reject low quality eggs before shipment. By eliminating substandard eggs before shipment, a penalty against the entire production is avoided.
- C. Grading. An electrically operated grader saves many hours of labor. Grading is important because it enables the farmer to get the highest prices for his heaviest eggs and average prices for the rest. Without grading he would obtain only an average price for all eggs.
- D. Egg Coolers. Cabinets fitted for holding one or more wire egg baskets and an electric fan to drive moisture cooled air over the eggs cooling them are easily constructed. This cooling reduces egg spoilage and is especially necessary where eggs are to be shipped or refrigerated.

